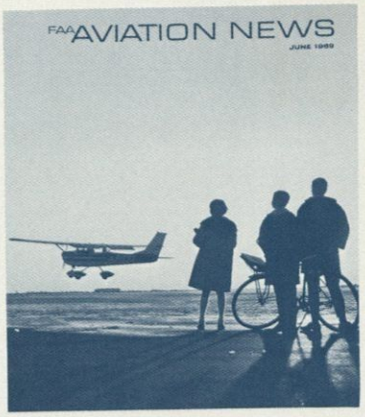
FAA AVIATION NEWS

JUNE 1969



COVER

A family airplane is becoming as desirable as a family car in many sections of the country. For facts and figures on what it costs to operate an aircraft safely for personal travel, see page 4.

FAA AVIATION NEWS

DEPARTMENT OF TRANSPORTATION / **FEDERAL AVIATION ADMINISTRATION** VOL. 8 NO. 2

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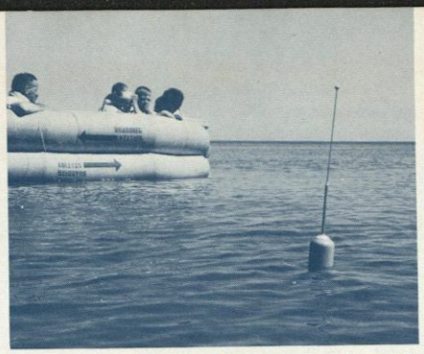


Left—one type of FAA approved crash locator beacon is installed in the vertical stabilizer, where minimal damage may be expected in event of a crash. **RIGHT**—other approved sites are in aft section of fuselage. Beacon should eject and function automatically if impact is severe; if not, equipment should be easily removable. **Above**—floating beacon with aerial.

Bringing Them Back ALIVE

New FAA Advisory Circular on equipment and techniques for locating downed aircraft promptly

Early this year a DC-3, engaged in air taxi operations, disappeared on a flight over mountainous terrain, from Hawthorne, Nev., to Burbank, Calif., with 35 persons aboard. Presumably lost in the High Sierras, the plane has not yet been recovered.

Such incidents are rare in modern aviation. Aircraft seldom remain lost for more than a few hours, or days at most. But occasionally an airplane disappears for weeks or months, or even years, with tragic consequences. To prevent such mishaps, FAA has evaluated various kinds of electronic equipment and search procedures for establishing contact with a downed plane or crew and is considering a proposed rule change marking beacons mandatory on air taxis.

On the basis of recent findings, just-published Advisory Circular 91-19 ("Emergency Locator Beacons—Crash, Survival, Personnel") recommends voluntary installation of crash locator beacons in all types of general aviation aircraft and defines three classes of survival equipment. The circular also describes an inexpensive automatic gain control meter which can be tied in with any aircraft receiver to give a visual readout of signal strength.

With the meter, rescuers need not depend on the audible strength of the beacon signal —which can be deceptive after prolonged listening—to determine when they are approaching or departing from a transmitting beacon. A simplified search pattern has been designed to allow users of the gain control meter to track a distress signal quickly to its source.

The advisory circular makes three additional recommendations to pilots which could cut search time and increase the possibility of rescue: (1) indicate on the flight plan the class of radio beacon aboard; (2) take the time to learn other actions that would make aircraft more visible in the event of a crash, such as clearing the accident site, starting fires, smoke signals, using flares, etc.; and (3) carry flotation type survival radio equipment and other emergency gear during all extended overwater operations. This equipment can generally be rented at airports adjacent to large bodies of water.

The circular divides emergency signalling devices into three distinct categories—crash locator beacons, personal locator beacons, and self-buoyant survival radio equipment.

By FAA's definition, a *crash locator beacon* is a fixed installation, one attached to the fuselage or tail surfaces as far aft as possible to minimize crash damage. Beacons built to be ejected and to function automatically on impact would also have to be designed so that they could be easily removed from the aircraft and operated manually in the event of a controlled crash where no significant impact occurred.

Personal locator beacons are portable, lightweight, manually operated and designed to be carried on the person, in the cockpit or attached to a parachute.

Survival radio equipment is self-buoyant, water resistant, portable and can be operated by unskilled persons. The radio may or may not have voice capability.

All three units broadcast a distinctive downward swept audio tone simultaneously on both emergency frequencies, 121.5 MHz and 243.0 MHz distress signal. All would operate from self-contained power sources.

The cost of the equipment can range from $80 to $1,000 for approved crash locator beacons, and from $200 to $1,000 for acceptable (over water) survival radio equipment. Installation costs for "fixed" beacons vary with complexity of the unit and local labor rates. However, even the most elaborate beacon can be installed in one working day.

FAA's 62 full-time flight inspection aircraft—52 in the U.S., 5 in the Pacific and 5 in Europe—are now equipped with automatic gain control which gives a visual readout of radio signal strength, and all now monitor 121.5 MHz. Extensive tests by FAA have demonstrated that even under IFR conditions the location of a downed aircraft equipped with an operating beacon can be discovered within approximately an hour after the search plane picks up the signal.

In addition, tests by Civil Air Patrol planes *using only standard VHF receivers* have shown that beacon-equipped downed aircraft can be located with encouraging promptness and accuracy. Both the FAA and CAP tests have been made under a wide variety of conditions and terrain, including mountains, canyons, marsh lands, and deserts.

FAA has plans to equip all its flight inspection aircraft with new direction finding equipment. The Department of Agriculture has scheduled installation of direction finding equipment in its aircraft, and is considering installing equipment in certain fire watch towers for monitoring 121.5 MHz.

(FAA recommends against use of obsolete military locator beacons since most of these emit only a steady tone modulation and they may not transmit simultaneously on both 121.5 MHz and 243.0 MHz.)

Copies of AC-91-19, "Emergency Beacons—Crash, Survival, Personnel," may be obtained free from Department of Transportation, Federal Aviation Administration, TAD 484.3, 800 Independence Ave., S.W., Washington, D.C. 20590. ■

Flying Figures

How much to fly airplane in the window— The one with the silvery tail?

To the perennial question, "Is it cheaper to fly your own plane?" the answer is, "It *can* be, under certain selective circumstances." According to a new FAA report, "General Aviation Costs", if you own a single-engine four-seater, and use it 200 hours a year, with all seats occupied, the cost per passenger-mile (5.6 cents) may be slightly cheaper than almost any form of airline transportation. It is still about twice as expensive as operating an automobile (2.75 cents a seat/mile) assuming there are four persons in the vehicle.

A key word in considering the economical value of a private airplane is utilization. The multimillion dollar jets of the airlines are profitable, in part, because they are in service as much as 10 to 15 hours every day. This high use factor, plus large seating capacity, brings the cost of an airline ticket down to 5.5 cents a mile on the major trunks (7.6 cents on local service airlines). The light single-engine aircraft, one to three place, is used about 100 hours a year, on the average, (three hours a week), and costs the owner about nine cents a seat/mile.

If the same light plane is used for 200 hours a year, the seat/mile cost drops to 7.9 cents, and it tapers off to an even 6 cents at 400 hours. But this kind of utilization is not normally achieved in a small light plane in terms of recreational transportation. It calls for nearly eight hours of flying time each week.

The pilot-owner who wishes to take a family of four on his air travels can match or better average airline fares with less difficulty. In average use, the single-engine four-seater is flown 200 hours a year and costs the owner 5.6 cents a seat/mile. If the utilization is doubled, the seat/mile costs drop to 4 cents. But again, 400 hours is a great deal of flying time to log on a single-engine aircraft, especially when used primarily for personal travel.

Partnership, Clubs Reduce Costs

Shared ownership of airplanes is one means of spreading fixed cost and thereby lowering the seat/mile costs. Flying clubs also reduce costs, while retaining some of the satisfaction of private ownership.

When you move up to the twin-engine class of aircraft the seat/mile cost doubles. From the standpoint of economy, there can be no consideration of this class of airplane for personal or recreational purposes. (Other reasons such as range, speed, convenience, etc., may of course be significant.)

Viewed as a means of transportation for business purposes, the piston-driven twin shows a curve of operating costs which improves economically even more radically than the curve for single-engines. The same twin that will cost its owners over $100 an hour to operate when logging an average 260 hours a year will cost less than $71 an hour if the utilization is doubled. The seat/mile costs will drop from about 10 cents to 6½ cents, according to the report.

Since these seat/mile costs compare favorably with airline ticket prices, the business twin can obviouly justify its role in transportation if sufficient utilization can be had. Keeping the aircraft in the air for 500 hours a year would require an average logging of approximately two hours every business day. Few small businesses will place this kind of demand on an aircraft's time.

Here again, joint ownership or use of an aircraft may be the solution. Where the services of a multi-engine aircraft are made available to a number of small business firms, preferably located at or near an industrial airpark, the "break-even" operating figure could become a reality.

With efficient scheduling, the aircraft may be kept active with most or all seats occupied the year around. Some of the prestige of having an aircraft exclusively for the use of one firm is lost, of course, but a great deal may be gained in terms of convenience, time-saving and even economy.

When you consider turboprop and jet equipment, there can hardly be any question of matching airline seat/mile costs. The average hourly operating cost of a turboprop is about $350; about $500 for a pure jet. These figures are based on a calculated average utilization of between 450 and 500 hours a year, and include the expense of maintaining a flight crew, almost invariably a necessity in the case of corporate aircraft.

On a seat/mile basis, with average use, the turboprop costs about 8½ cents and the pure jet about 13 cents, assuming full occupancy and normal use. Even if it were possible to double this usage and keep the jet flying, fully loaded, 1000 hours a year (a very high figure, for corporate flying), or four hours every working day, the report estimates the cost per seat/mile would still be nearly double that a trunk airline ticket.

Time Is Money

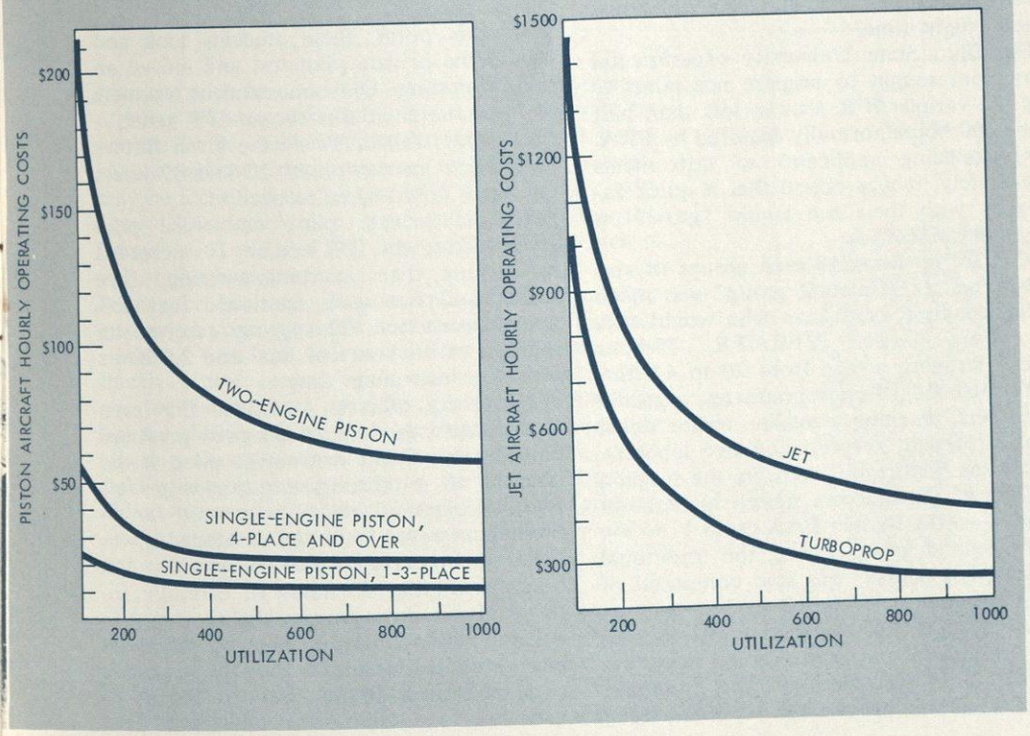
Indeed, the corporation jet is looked upon with so much favor now primarily because it is a *time*-saver. Top officials of big corporations are high-priced individuals; their hourly remuneration runs into hundreds of dollars. If a privately owned jet can fly a company president a thousand miles, allow him time to conduct critical negotiations on the spot, and return him to his office the same day, where commercial service would have necessitated an overnight stay, the advantages to the company could easily outweigh the high cost of operating the aircraft.

Similarly, the corporation jet offers a variety of "fringe benefits," such as the opportunity to study, converse, telephone, and otherwise carry on a working schedule at 40,000 feet with relative privacy. Since the corporation jet usually flies directly to the destination, with no interruptions for connecting flights, scheduling delays, etc., the

Operating Costs of Average General Aviation Aircraft, by Type Class, at Various Utilization Rates

Type of Costs and Aircraft	Utilization (Aircraft Hours Flown per Year) 200	300	400	500	1000
Annual Costs					
Single-engine piston, 1-3-place	$ 3,133	$ 3,937	$ 4,741	$ 5,545	$ 9,565
Single-engine piston, 4-place and over	6,752	8,195	9,638	11,081	18,296
Two-engine piston	25,010	28,660	32,310	35,960	54,210
Turboprop	118,167	133,541	148,915	164,289	241,159
Jet	174,826	202,668	230,519	258,352	397,562
Hourly Costs					
Single-engine piston, 1-3-place	$ 15.67	$ 13.12	$ 11.85	$ 11.09	$ 9.57
Single-engine piston, 4-place and over	33.76	27.31	24.10	22.16	18.30
Two-engine piston	125.05	95.52	80.78	71.92	54.21
Turboprop	590.84	445.09	372.29	328.58	241.16
Jet	874.13	675.49	576.27	516.70	397.56
Aircraft-Mile Costs					
Single-engine piston, 1-3-place	$ .157	$ .131	$ .119	$ .111	$ .096
Single-engine piston, 4-place and over	.224	.181	.160	.147	.121
Two-engine piston	.616	.471	.398	.354	.267
Turboprop	2.003	1.509	1.262	1.114	.817
Jet	1.943	1.501	1.281	1.148	.883
Available Seat-Mile Costs					
Single-engine piston, 1-3-place	$.079	$.066	$.060	$.056	$.048
Single-engine piston, 4-place and over	.056	.045	.040	.037	.030
Multiengine piston	.118	.091	.077	.068	.051
Turboprop	.143	.108	.090	.080	.058
Jet	.221	.171	.146	.130	.100

HOURLY OPERATING COSTS



traveler is spared some of the fatigue-inducing aspect of air travel, and may arrive at the conference table in a more alert frame of mind.

Since there is no clearcut way of adding up the dollars and cents values of these advantages, it is not possible to make a general statement about the economic benefits of corporate aircraft. Within each category of aircraft there is considerable variation, as to original cost, fixed and variable costs. The new single-engine aircraft considered in the survey costs from about $10,000 to $50,000; the multi-engine planes range from about $50,000 to $260,000; and the turbine aircraft range to $2.4 million each.

Fixed costs include depreciation, insurance, storage, crew salary and miscellaneous. Variable costs cover fuel, oil, inspection, maintenance, overhauls, parking, spare parts and pilot expense. With smaller aircraft, variable costs average roughly only about half of the fixed cost. With the jets, the two figures are nearly equal.

Suitability Must be Considered

In choosing an aircraft for personal or business use, the pilot-owner must be concerned with suitability as well as economy. The aircraft which will fly him faster and cheaper around the country may not be able to take him in to the small airfields in service at his destination. Speed is always desirable, but being able to walk directly from the small airstrip to the recreational site or business conference is also important. If an additional aircraft must be used to complete the journey, costs go up sharply. Travel on a helicopter airline, for example, averages about 35 cents a seat/mile.

In the last analysis, safety is the overriding factor. An airplane which does not have the required service ceiling, baggage capacity, range or instrumentation is no bargain no matter how low its operating costs may be. The airman who knows exactly what it costs to operate his aircraft can be a safer pilot if he uses this knowledge to avoid placing excessive demands on his airplane.

The statistics on general aviation operating costs were assembled by FAA in order to establish some baseline economic data. There was no intention of comparing the merits of various forms of transportation. The fact that the operating costs of these aircraft are higher in most instances than the expense of travel by automobile or airline does not necessarily mean that their use is uneconomical. As a travel tool that can enable businessmen to arrive at fast decisions, and to act on them with equal speed, the general aviation aircraft is just beginning to show its versatility.

Copies of "General Aviation Aircraft Operating Costs" AD 683 306 are available for $3.00 each from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Va. 22151. Make checks or money orders payable to CFSTI. ■

Left—experimental private pilot group first learned basic flight maneuvers in ground trainer. **Right**—"command ability" could be developed by increasing supervised solo cross-country flights. **Below**—fully instrumented aircraft were used by all pilot-trainees in test.

Shortcut to IFR?

Is there a shortcut to an IFR ticket? The question has tantalized impatient fledglings and seasoned pilots ever since Jimmy Doolittle demonstrated in 1929 that an airplane could be flown safely by the use of instruments alone.

The Federal Aviation Administration was just as curious as the rest of the aviation community—a carefully controlled inquiry had never been done before in U.S. civil aviation. Could a zero-time pilot candidate, given a proper mixture of VFR and IFR training, qualify for an instrument rating upon completion of the private pilot course?

FAA's Aircraft Development Service contracted with Ohio State University's Aviation Department to develop and field test a curriculum that would combine private pilot training with instrument training to produce a fully qualified IFR private pilot. The University worked out a 75-hour course, spread over 60 instructional periods, which had the unique feature of introducing the zero-time student to all pertinent flight maneuvers using instrument references *first*, followed by visual references.

This was a sharp break with tradition. Under long-established practice, pilots-to-be have been trained first to handle an airplane with reference to the sky and the land, with only enough drill under the hood to enable them to maintain control of an airplane by reference to flight instruments under *emergency* conditions.

To qualify for an IFR rating, FARs require (1) qualification as a private pilot; (2) successful completion of a written exam; (3) at least 40 hours of instrument time, 20 of which can be logged in a ground trainer; (4) passing a practical examination which includes an oral quiz, instrument flight test, and a radio navigation and approach procedures test; and (5) 200 hours of total flight time.

The Ohio State University experimental curriculum sought to prepare non-pilots to pass the various IFR tests in less than half of the 200 hours normally required by FAA. By introducing applicants to instruments immediately, it was hoped that a quick familiarity with their use would "grow" on the pilot trainees.

OSU set up three 15-man groups of students. The "experimental group" was made up of zero-time candidates who would take the newly devised VFR/IFR, 75-hour course. Ranging in age from 20 to 44, this group included 10 undergraduates, a graduate student, teaching associate, airline ticket agent, professor, surgeon and two laborers. (When the final results were in, the surgeon and one of the laborers scored highest—in the 90s—in the written FAA exam.)

The second group, taking the traditional private pilot course, was also composed of zero-time novices, from 19 to 34.

The third group, qualified pilots seeking IFR ratings in the conventional way, resembled a typical class of IFR students. There were nine private and six commercial pilots. As a group their average flight time was 367 hours, with one commercial pilot having 1,500 hours. Instruction was given by the same instructors to all groups, and all flew from Ohio State University Airport.

Training started in October 1967 and continued to June 1968. The experimental group and the group of private and commercial pilots pursuing the regular IFR program, used three fully instrumented Piper *Cherokees*. All aircraft were equipped with 360-channel communications transceivers, navigation receiver, VOR/localizer indicator, ADF receiver and marker beacon receiver. In addition, one aircraft had a glide slope receiver and indicator, and a 4096-code transponder.

Students in the experimental group did not come into contact with an actual airplane until they had completed three one-hour sessions in the ground trainer. The first hour or two was conducted with the canopy removed. A line taped on the walls surrounding the trainer provided a makeshift but effective "horizon."

The first encounter with the aircraft came in the fourth instruction period. It was minimal—preflight, explanation of instruments and controls, engine run-up and shut-down, and tie-down. When the students took to the air, in the fifth period, the instructor demonstrated simple maneuvers with the hood off and on. The student was allowed to try his hand at straight and level flight, standard rate turns, medium bank turns and medium bank turns to a visual reference.

By the time the average student in the experimental course had reached the 60th instruction period he had a total of 70.9 hours, about half IFR and half VFR, 51 dual hours, and 19.4 hours of solo flight. The student also had 12 hours of ground trainer time.

At this point, these students took and passed the private pilot test and moved on to IFR testing. Only one student was able to meet the standards for an IFR rating—12 students failed. Two were given further instrument instruction of 20 and 30 hours but again failed when retested.

In the private pilot/commercial pilot group taking the IFR course, 10 succeeded in earning their instrument rating, three failed, and two were continued for additional instruction. This group received an average of 36 hours of dual and 2.0 hours of actual instrument time.

University officials concluded that even though the experimental program produced only one qualified instrument pilot, it did succeed in producing a *superior private pilot*. "Command ability" necessary for an instrument rating could be developed it was believed, by expanding the program to 120 hours, including 40 hours of carefully supervised solo cross-country flights.

The study concludes that no substitute has yet been found for inflight seasoning as pilot-in-command.

Frank J. Clifford

Traffic at Ten O'Clock . . . Do You Have Him in Sight?

PERSPECTIVES V

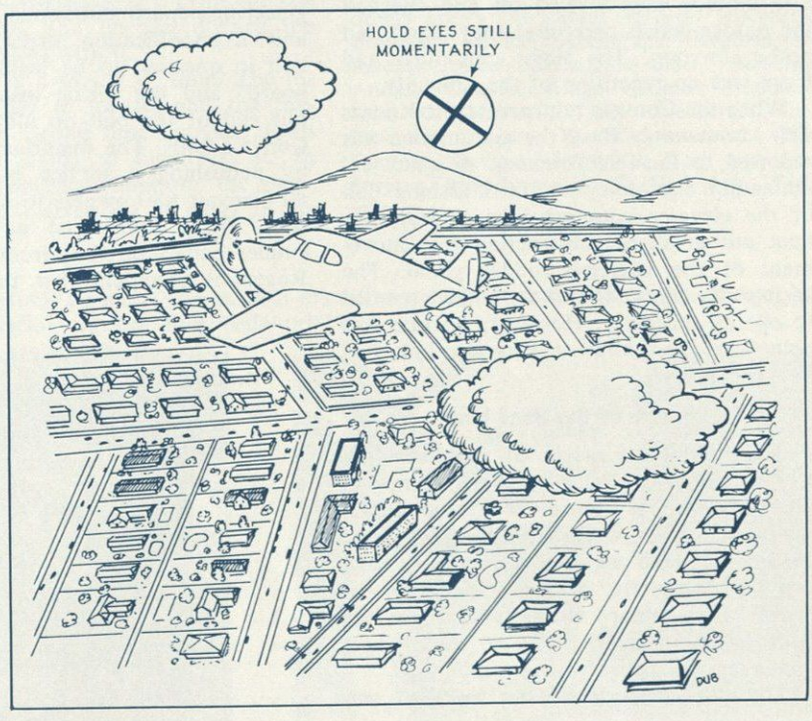
Picking out moving aircraft against a cluttered background is not always a simple matter, even when aided by radio advisories. Understanding how the eye sees motion will introduce you to a useful trick.

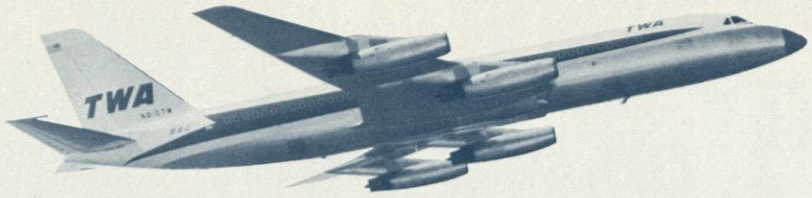
Many a pilot has had the embarrassing experience of being asked repeatedly by the control tower if he has the traffic in his vicinity in view, without being able to confirm. Conditions may be VFR, the aircraft may be identified as "a light twin at ten oclock, just about 300 feet below you and passing by the Temple . . ." and still you may not be able to pick it out of the background.

It may be because you are inexperienced or over anxious as your eyes race over the area, but the fact is that if you are over a housing development or thickly settled section with smoke or haze in the air, the background provides a natural camouflage for the elusive other plane. A helpful technique for spotting aircraft, under these circumstances, is to hold your eyes momentarily on the area in question. *Objects in motion, against a stationary background, tend to attract attention; if the eyes themselves are in constant motion, this is less true.*

NOTE:

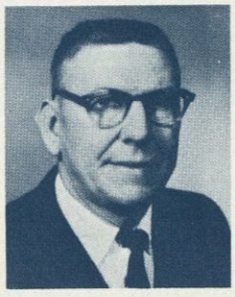
After this *momentary* resting of the eyes, you should resume a constant scan of all quadrants of the sky to protect yourself and others. This trick should only be used when you fail to spot a moving target. ■





Cause & Cure

The success stories of two outstanding m in FAA's 6th Annual Aviation Mechanic Sa safer and better today because of the achiev maintenance, and Melvin W. Longlet in gen in cash and other honors given them by a H. Shaffer presented them with medallions i



TWA aircraft mechanic Warren G. Rogers suggested fix for Convair 880 jetliner.

If a race could be lost for lack of the proverbial nail, is it not also possible that an $8 million, 150 passenger airliner could go out of control and crash because a bolt head in the control linkage protruded a fraction of an inch too much? TWA speciality mechanic Warren Rogers engaged in an ingenious bit of detective work to make certain that such a tragedy never would happen.

The first indication that a hazard existed on the Convair 880 appeared during a routine engine-out takeoff practice maneuver. As the young TWA pilot-trainee began to apply opposite rudder to compensate for the throttled engine, he became aware of an unexpected resistance in the rudder pedal. Using all his strength, he was unable to force the pedal down—and he could feel the airplane beginning to go out of control.

He called for help from the at-first-disbelieving instructor in the righthand seat. Kicking savagely, the two pilots just managed to jam the pedal down and move the rudder around in time to recover control of the aircraft. As soon as they had climbed to a safe altitude they leveled off and checked the rudder pedals carefully: they could find nothing wrong. The flight continued and there was no repetition of the difficulty.

When the Convair returned to the Kansas City Maintenance Base, the malfunction was reported to the line foreman. A quick examination disclosed that the attaching link of the elevator counterbalance spring was bent out of shape, obstructing free movement of the adjacent rudder pedal. The spring was repaired, and the rudder seemed to operate properly. However, no one was able to suggest *how* or *why* the link had been deformed.

Mystery of the Bent Link

The mysterious origin of the bent link troubled Rogers. Could it happen again and block the rudder control at a crucial moment, with the aircraft fully loaded with passengers? Had the troublesome link been bent inadvertently during installation or routine maintenance work? Or if there had been a design flaw, surely it would have come to light earlier . . . wouldn't it?

The inconsistency of the problem was baffling. Why had the failure occurred on takeoff, and not subsequently? Was there some subtle chain of cause and event that had been overlooked . . .? Rogers set himself to the task of finding out.

On his own initiative, he conducted hours of operational checks on the 880's elevator and rudder control systems. Both functioned perfectly. Rogers focused his attention on the elevator counterbalance spring linkage, where the deformation had taken place, and on the rudder pedal arm, located under the floor boards directly beneath the pilots' feet. The two control linkages were spaced only a quarter of an inch apart. Clearance appeared to be ample, as Rogers manipulated the controls over and over again, and yet—suddenly he knew the answer.

When he pulled back on the wheel in such a way as to impart a sharp or heavy action on the elevators, the counterbalance spring exhibited a momentary slack. If at this precise moment full rudder were applied, the head of a bolt in the slackened spring link could snag and obstruct the rudder pedal arm. The bent linkage had not *caused* the training flight incident—it had *resulted* from the forcible moving of the snagged rudder arm by the pilots. And it could happen again!

Rogers concluded that if the bolt were installed in the opposite direction there would be ample clearance under all conceivable conditions, and no snagging of the elevator control spring could take place. The Convair maintenance manual contained no such installation procedure.

Acting on Rogers' findings, TWA's engineering department issued an alert bulletin and a modification order requiring the bolt in question to be installed "head outboard" and the spring installed under the nut end of the bolt on all of the carrier's Convair 880s. The manufacturer responded by publishing a service bulletin notifying all Convair 880 owners to alter the installation. There have been no more jammed rudder pedals on the aircraft, and Warren Rogers is confident that this problem has been banished for good.

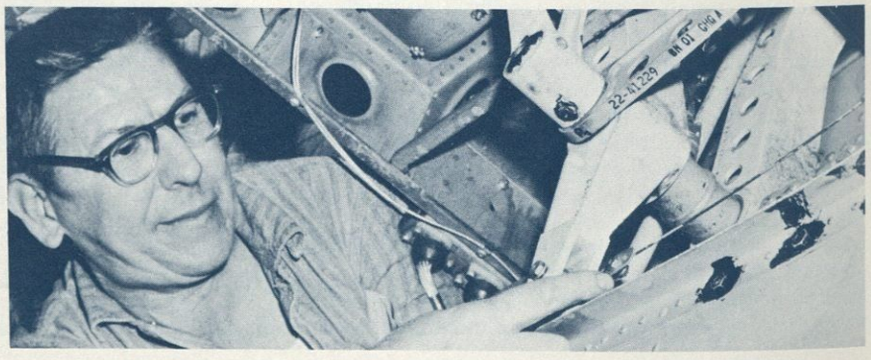
As one of the two national winners in the sixth annual FAA Aviation Safety Award Program, Rogers is the recipient of a $500 cash prize, an all-expense paid trip to the nation's capital—as well as the respect and admiration of the air-traveling public, who depend on the integrity of maintenance men to help keep flying safe.

Known to his fellow employees as an innovator, Rogers has been employed by TWA since 1955. Prior to that he was an inspection foreman for General Motors and actually began his career as an automoblie mechanic.

During World War II he served with the U.S. Army Air Corps as a flight engineer assigned to C-47 and B-25 aircraft. He and his wife have two daughters—one is 20 and the other 14 years old.

Rogers was chosen national air carrier winner from a field of eight semifinalists representing each of FAA's regions. They are: Bernard L. Sherwood, Wein Consolidated Airlines, Fairbanks; William M. Ziegler, American Airlines, Tulsa; Lawrence Londerman, Pan American World Airways, Miami; Charles Say, Hawaiian Airlines, Inc., Honolulu; Andrew B. Perras, Eastern Air Lines, Inc., Miami; Willard Knight, Braniff Airways, Inc., Dallas; and Hilburn L. Rodgers, United Air Lines, San Francisco. ■

Rogers points out the bolt that caused the rudder jam on take-off.



aintenance men, chosen as the nation's best fety Awards Program. American aviation is ements of Warren G. Rogers in air carrier eral aviation. Both men are richer by $500 grateful industry. FAA Administrator John n a recent ceremony in Washington.

On any given day in the week, you may find a Minnesota Mining and Manufacturing Company JetStar taking off from St. Paul-Minneapolis Airport for Paris, Geneva or any major capital you may care to name. International flights on one of the three company jets are routine, thanks to 3M's competent aviation department. And thanks to Melvin Longlet, manager of aircraft maintenance and ground operations, these trips are now made without the burdensome load of books and reference material formerly carried on board to make certain that the aircraft could be properly repaired at any airfield in the world.

The JetStar's maintenance "library"—some 10,000 pages in all—included a complete set of manuals, parts catalogs, structural repair manuals, all service bulletins, service changes, wiring diagrams, engine overhaul manuals, engine parts catalogs, and all of the Lockheed training manuals.

This mass of data would not only take up the space of two passengers but also imposed upon Longlet's shop the necessity of checking and updating all of the reference material to be carried on each flight. Narrowing down a selection for each aircraft was a worrisome task. While the need for on-the-spot repairs in some distant airport was infrequent, it was important that all vital information be available when needed.

The solution to this dilemma was to find a suitable means of making the reference material lighter and more portable. Microfilm was an obvious answer.

Microfilming the 10,000 pages reduced the 300-pound bundle to four cartridges of film weighing only five ounces each. But for microfilm to be of any use to the mechanic, he must be able to scan through it readily. Also when he found the section of interest to him, he would need a paper copy to work from.

Reader-printers Found

For use in the base, Longlet obtained a company reader-printer that could scan the 2,500 microfilmed images in a cartridge in less than one minute. When the desired page was found, the printer produced an enlarged, dry print of it in five seconds.

For use with the airplane, Longlet found a battery-powered, portable reader-printer, weighing only 35 pounds. The compact machine, packed in a simple, luggage-like case, provides space for carrying the microfilm cartridges as well. Longlet found that his new system solved three of their other problems.

First, it allows his department to keep one set of manuals—right in the office where they can be updated and maintained by one person.

Second, there is no longer any danger of a mechanic "borrowing" and failing to return any vital pages from the manual. He simply need locate the desired page on the reader, press a button, and within five seconds he has an enlarged, dry print for use at his work site, and he can discard the sheet when finished with it.

Third, there is a saving of time. The information is easy to locate, and the mechanic need not spend time copying down information or trying to memorize it. In an in-flight emergency situation the engineer can locate a given set of pages in far less time than if he had to search through boxes of books.

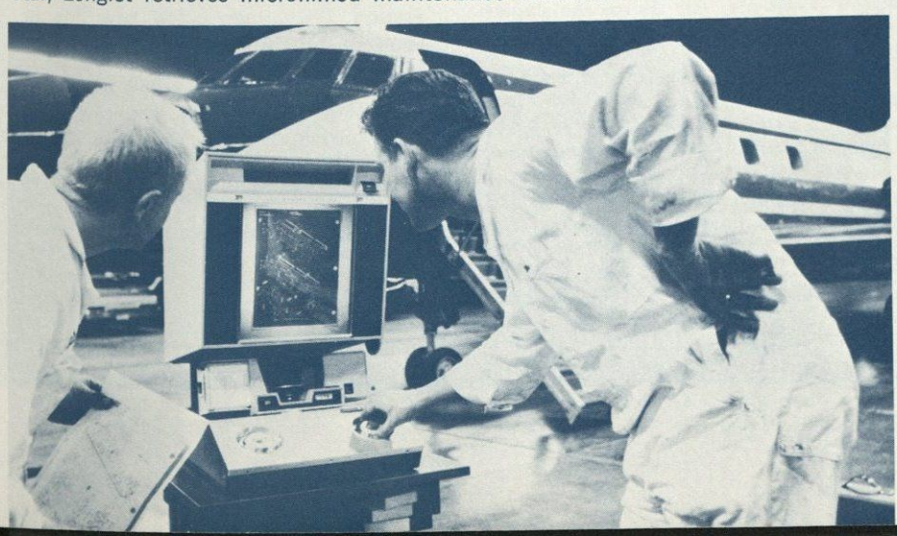
Melvin Longlet holds microfilm substitute for four shelves of books.

Perfection of this system for microfilming and retrieving essential maintenance reference material has opened the door to greater international use of corporate aircraft, especially in remote areas where formerly the problem of proper maintenance might have discouraged this kind of travel. Melvin Longlet's achievement is a good example of how initiative can pay big dividends.

Longlet joined the 3M Company in 1950 and was instrumental in the formation of its aviation department. He has been a licensed airframe and powerplant mechanic since 1943 and is an instrument rated pilot with 6,000 hours flying time. He and Mrs. Longlet have three grown sons.

Mr. Longlet was selected national general aviation winner from semi-finalists representing each of FAA's eight regions. The others are: C. G. "Slim" Walston, Anchorage Propeller Service, Anchorage; Kenneth W. Reichel, Jones and Laughlin Steel, Pittsburgh; Andrew Caserio, Aloha Airlines, Honolulu; Jesse G. Maxwell, Delta Beechcraft, Inc., Memphis; James W. Delahoussaye, Paul Fournet Services, Lafayette, La.; and Earl Severns, Robertson Aircraft, Belleview, Washington. ■

Left—on hangar floor, 3M Co. mechanics use stationary reader-printer to make copies from microfilm for use at work site. **Right**—aboard JetStar, Longlet retrieves microfilmed maintenance reference material with portable reader-printer.



call us anytime

A cautious descent . . . and a fleeting glimpse of the runway through a break in the clouds.

What do you do when you pick up a weak signal from a lost pilot, trapped in thick clouds between the Cumberland and Smoky Mountains, beyond the range of radar or radio reception? No flight plan, no IFR equipment—how do you find him before ice and snow terminate his flight tragically?

The venerable Stinson "Station Wagon" was at 5,000 feet en route from Georgia to Tri-City Airport at Bristol, Tenn., on a wintry day when low ceilings and snow showers were reported at Knoxville and vicinity. The pilot, alone in the fabric-covered aircraft, with no IFR rating or instrumentation, waited too long before turning back.

Strong adverse winds cut his ground speed to a crawl, as the clouds closed in. Land obstructions well over 3,000 feet made a descent inadvisable. His radio call for help just barely reached FAA's Knoxville tower, and his receiver could not pick up the reply. Snow showers surrounded him. What to do?

Knoxville tower radar controller Harry Starkey and Raymond Hawkins and Robert Swanson, the tower chief, began by relaying DF steers to the lost pilot via an airborne Air Force helicopter that happened to be in the area practicing for jungle rescue work in Vietnam.

The following excerpts are from the taped transmissions recorded between 12:14 p.m. and 2:00 p.m. on January 6, 1969.

1714:05 (Z) Stinson 27C: Knoxville Radar Approach, this is Stinson four one two seven Charlie. Over.

Knoxville Tower: Stinson 27 Charlie, Knoxville Approach, go ahead.

Stinson 27C: Radar Approach Control, do you hear me? I believe my position is about 30 miles out from the Knoxville OMNI. I am not sure of this. My altitude is at 5,500 feet, what do you advise? Knoxville radar, do you hear me?

Approach Control: Helicopter 284, (an Air Force helicopter airborne over Knoxville) if you can talk to the aircraft Stinson 27C, we would appreciate it. He is not receiving us. Tell him if he can maintain VFR and head 245 that will be the bearing to the Knoxville Airport.

A.F. Helicopter: Roger. Stinson 27 Charlie. This is Air Force helicopter 13284. Approach Control advises your bearing to Knoxville 245 degrees. If you are able to maintain VFR, maintain altitude.

Stinson 27C: I am flying IFR at this time. Over.

A.F. Helicopter: Roger, understand. Approach Control—

Approach Control: Yes, we heard that. We have no knowledge of his flight plan and advise him, if practicable, to obtain a position of VFR and hold. We do not know his position yet.

A.F. Helicopter: Stinson 27 Charlie, Approach Control advises they do not have radar contact with you. Be advised we came in from just east of Chattanooga. In the valley it is fairly clear. We are still in the clear at 2500 and from the conditions that we have flown through, your best bet would be to the west, toward Chattanooga.

Stinson 27C: Roger, read you loud and clear. I am going to drop down and lose some altitude. Over.

Approach Control: Air Force helicopter, ask the aircraft again if he is on solid instruments and if so, we suggest he does *not* descend.

A.F. Helicopter: Roger. 27 Charlie, Approach Control advises that you do not descend at the present time.

Stinson 27C: Roger, we'll maintain altitude. Over.

Approach Control: Air Force helicopter would you relay for us and ask him if he is in the clouds or if he is VFR?

A.F. Helicopter: Roger. Stinson 27 Charlie, are you in solid weather?

Stinson 27C: I am in the clouds at 5,500 feet. Approach Control, I can read you now. Over.

Approach Control: OK. How much fuel do have on board, and how many passengers?

Stinson 27C: One soul aboard. I have about 25 gallons.

Approach Control: Are you IFR equipped and qualified?

Stinson 27C: No, sir. Over.

Approach Control: Roger, heading to Knoxville is 250. We don't see any targets at your position.

1749:25 Stinson 27C: There is some ice hitting my windshield at this time.

Approach Control: Stinson 27 Charlie. Roger. Keep a watch on your airspeed and if it starts going down, let us know.

Stinson 27C: Roger.

Approach Control: Stinson 27 Charlie, I have a target about 50 miles northeast of Knoxville that could be you. For radar identification, turn right heading and take your time. Make it a slow gradual turn so as not to lose control of the aircraft.

Stinson 27C: Roger, 27 Charlie.

Approach Control: Radar contact 44 miles east-northeast of Knoxville. Turn left heading 320.

Stinson 27C. Roger.

Approach Control: Stinson 4127 Charlie, radar vector towards Morristown Airport. Morristown Airport at twelve o'clock, 10 miles. We just had a report from an aircraft in the vicinity of Morristown. He had the ground in sight from 6,000 feet. Over.

Stinson 27C: I have the ground in sight at 5,500 feet, at this time. Request permission to descend to 3,500 feet.

Approach Control: Stinson 4127 Charlie, make descent at pilot's discretion. However, the minimum safe altitude is 6,000 feet in your position. The Knoxville weather is indefinite 300, sky obscured, visibility one with light snow and blowing snow. Stinson 4127 Charlie, also if you descend to under 3,500, there is a possibility we will lose communication with you.

Stinson 27C: Roger. You have me on a heading of 330. Are you taking me to an airport?

Approach Control: That's affirmative. Turn left heading 310. We are vectoring you towards Morristown Airport, eleven o'clock, 10 miles. Over.

Stinson 27C: Altitude 5,500, heading 310. Over.

Approach Control: Roger. What is your visibility and can you still see the ground?

Stinson 27C: Visibility 500 feet and I can see the ground. Over.

1810:00 / Approach Control: Stinson 4127 Charlie, turn left heading 280, turn left heading 280, and can you by chance see an interstate

highway just below you?

Stinson 27C: I don't see the highway yet. My heading is 280 at this time. I am approaching something, let me get back to it to see what it is.

Approach Control: Roger. See any landmarks at all?

Stinson 27C: It's hard to distinguish what they are from this altitude. I am at 5,500 at this time, and I cannot see the ground. I would rather come into Knoxville if you are reporting the same weather that Morristown is. Over.

Approach Control: We are a little bit worse than Morristown. We have 300 feet overcast and Morristown is estimated 5-800 overcast.

Stinson 27C: I am familiar with the terrain at Knoxville and I am not at Morristown. It may be safer for me to come in to Knoxville. Over.

Approach Control: Knoxville weather now indefinite 200, sky obscured, visibility one-half with snow, altimeter remains 2987, and it would be up to you if you want to try to come into Knoxville or attempt to get into Morristown. Can you see anything on the ground at all?

Stinson 27C: Negative. I seem to have a cloud layer under me at this time. What is my position in relation to the Morristown Airport?

Approach Control: Morristown Airport at three o'clock, 5 miles. Over.

Stinson 27C: I'm going to take a look at that airport.

Approach Control: Roger. Turn right heading 350 and make your turns slow and gradual so as to maintain control of the aircraft.

Stinson 27C: Roger. Over.

Approach Control: At pilot's discretion, descend to 4,500 and we'll see if we can still read you on the radio. And if you lose radio contact with us and you can't see the Morristown Airport, climb back up to 5,000 and call us again.

Stinson 27C: Roger.

Approach Control: And Stinson 4127 Charlie, quick as you see the ground, or river, or anything, let us know. Stinson 27 Charlie, radar contact lost, radar contact lost. Last heading to Morristown Airport 320 degrees and it was 4 miles. Over.

Stinson 27C: There is a cloud layer under me at this time, but it's broken. I'm going to drop down through the clouds on a heading of 320. If I cannot find the airport, I'll climb back up and contact you. Over.

Approach Control: Stinson 4127 Charlie, give me a call every two, three hundred feet. Over.

Stinson 27C: I've lost my airspeed indicator. Over.

Approach Control: Your carburetor heat is on, your pitot tube heater is on, that correct? But you have lost all your instruments?

Stinson 27C: No, sir, I have not lost all instruments. I have only lost my airspeed. I have no pitot tube heater. Carburetor heat is on. I am descending on down. Over.

Approach Control: Roger, do you have ground contact?

Stinson 27C: Negative.

Approach Control: You understand that the safe altitude is 3,300?

Stinson 27C: Roger. What is the altitude of the airfield?

Approach Control: The elevation of Morristown Airport is 1299 Mean Sea Level. Over.

Stinson 27C: Roger, 27 Charlie. At 2,500 feet and I cannot see the ground. Over.

Approach Control: 4127 Charlie, suggest you climb back to 4,500, and we will vector you on towards Knoxville. Are you on solid instruments or are you between layers?

Stinson 27C: Socked in. Over.

Approach Control: Roger. Stinson 27 Charlie, did you ever get your airspeed indicator back?

Stinson 27C: My airspeed indicator is only indicating 80 miles per hour at this time. I believe that to be incorrect. Over.

Approach Control: Roger. Maybe that is correct and you've got ice. How about icing conditions on your wings?

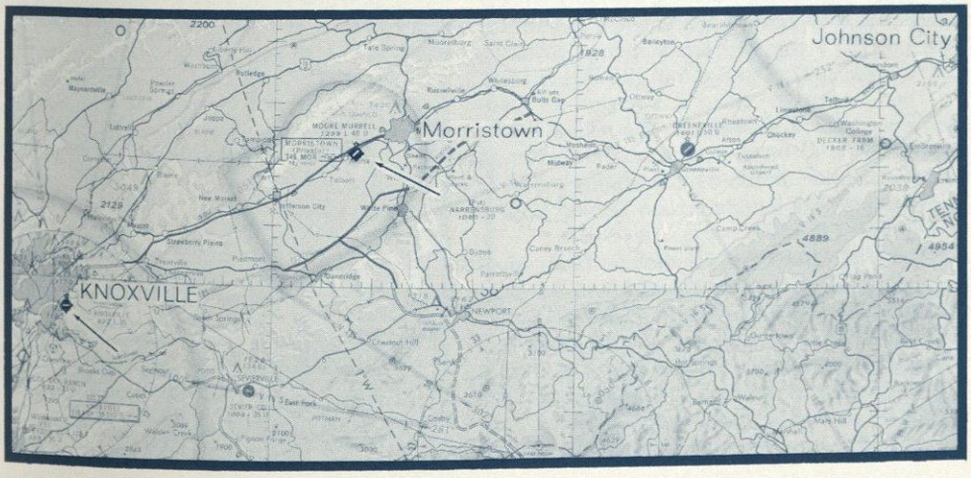
Stinson 27C: My wings seem to be OK. My engine is running rough. I have my carburetor heater on, but I think I may have some icing on my prop. Over.

Approach Control: Would you like to descend to a lower altitude and see if you can get out of the freezing level?

Stinson 27C: Roger. What altitude shall I descend to?

Approach Control: Descend to and maintain 3,500 at this time and see how that works out. Keep me advised of how your engine is running. You are 28 miles northeast of Knoxville.

Mile-high drama began when the non-IFR pilot reported himself lost in clouds and snow flurries in northern Tennessee hill country about 50 miles northeast of Knoxville, with no radio reception. Skillful directions relayed from FAA's Knoxville control tower brought the pilot to a safe landing at the Downtown Airport after a tense two hours.



1840:00 / Stinson 27C: My heading 260 now. Conditions are socked in. Ice on the windshield. Over.

Approach Control: Ice on the windshield. Roger, and how's your engine doing?

Stinson 27C: My engine has seemed to smooth out.

Approach Control: Roger. Just hold the 3,500 then for a while. We clocked your ground speed at 60 miles per hour. Over.

Stinson 27C: Sixty miles an hour? Do I have a head wind?

Approach Control: Affirmative, you are in a strong headwind. Stinson 4127 Charlie, the Knoxville Island Downtown Airport is twelve o'clock, 20 miles. We'll get the weather over there as we get you closer to the airport. Over.

Stinson 27C: Thank you, sir. I have some broken clouds now. I have the highway in sight which goes into Knoxville. Over.

Approach Control: Roger, Stinson 27 Charlie. The Downtown Airport has visibility about one-half mile and the ceiling is very low and we're breaking up over this airport here.

Stinson 27C: That sounds real good. Let's try the Downtown Airport first. Over.

Approach Control: Roger. We will be passing right by there on the way to Knoxville Airport. Can you see out your windshield or is it still iced up?

Stinson 27C: It is iced up right in the front. I can see out the sides a little bit.

Approach Control: Roger, thank you.

Stinson 27C: My altitude is 3,000 feet at this time, clouds broken. I do see landmarks. It looks like 2,000 feet would be clear. Over.

Approach Control: Roger, and we still report 500 overcast, visibility two, light snow. You can descend at your discretion. Over.

Stinson 27C: Roger, I am going down to about 2,000 feet. Over.

Approach Control: Stinson 4127 Charlie, the Knoxville weather now measured ceiling 1,400 overcast, visibility four with very light snow which is VFR conditions at Knoxville.

Stinson 27C: Roger. My altitude is 2,000 feet and visibility is good. Over.

Approach Control: Roger, Stinson 27 Charlie, the minimum in that area, safe, is 3,100. The Island Downtown Airport is two o'clock, 5 miles, and if you don't see that, we will bring you on towards McGhee Tyson (Knoxville) Airport.

Stinson 27C: Roger, 27 Charlie.

Approach Control: The Island Airport, are you familiar with it? It is right on the river and the runway runs east and wset. It is right beside the river.

Stinson 27C: Roger. I have been in that airport, thank you.

Approach Control: Stinson 27 Charlie, how about your windshield? Is it still iced up?

Stinson 27C: Negative. Windshield is clearing up and I believe I have Island Airport in sight. I am not sure at this time. Over.

Approach Control: OK, let me know when you see it for sure. The Island Airport at 230, 3 miles.

Stinson 27C: Roger, I do have that airport in sight at this time.

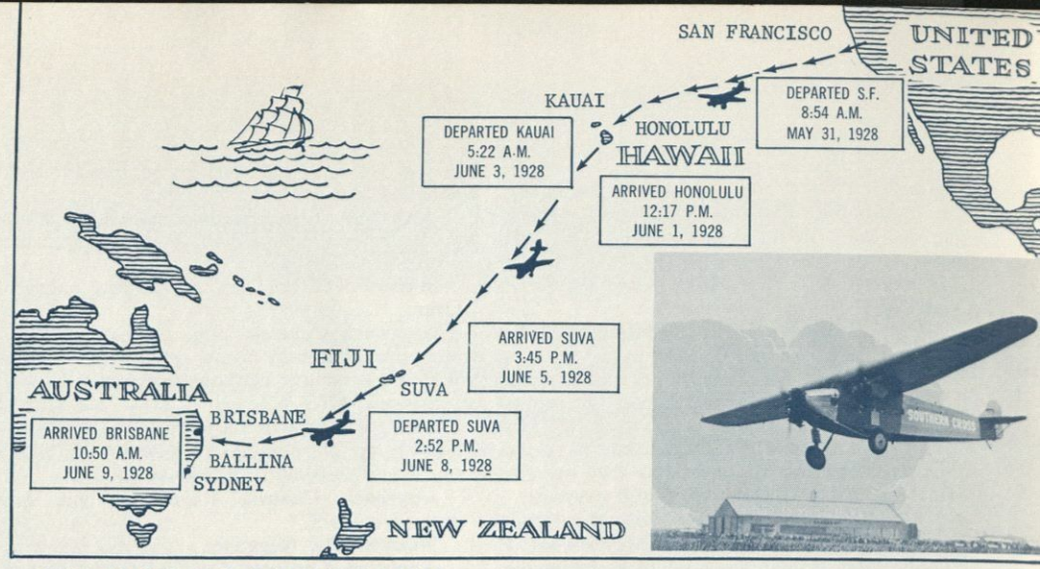
Approach Control: Roger, you wish to land at Island. Can you land in there and keep ground contact?

Stinson 27C: Yes, sir. Everything is OK. I certainly appreciate your help. Over and out.

1853:20/Approach Control: Roger. Glad to help you and call us anytime. ■

famous

FLIGHTS



The SOUTHERN CROSS

The date was May 31, 1928—one year and eleven days after Charles A. Lindbergh's history-making 33½ hour non-stop flight across the Atlantic.

As fog shrouded the San Francisco skyline, a four-man team in a rebuilt Fokker tri-motor were preparing for another historic trip—the first continuous flight across the Pacific. They were bound for Sydney, Australia—a distance of over 7,000 miles.

For Captain Charles E. Kingsford-Smith, a retired Australian Air Force pilot, and fellow Aussie Charles T. P. Ulm, another pilot who had served in Gallipoli and Flanders during World War I, this was a long-awaited day.

In mid-year, they had flown a seven-year-old plane 7,500 miles around the Australian continent in a record shattering ten and one half days. This experience convinced them that the trans-Pacific flight was not an impossibility. All they needed was a suitable plane and crew.

From the beginning, it was agreed that Kingsford-Smith, the more experienced man, would be command pilot, with Ulm as relief pilot. They had also hired two Americans—Harry Lyon as navigator, and Jim Warner as radioman.

The tragic loss of at least four exuberant pilots who had mistakenly trusted to single-engine aircraft in the famous Dole "Pineapple Derby" from Oakland to Honolulu convinced them that a large, multi-engine aircraft would be needed on the extended overwater flight they planned. They obtained a secondhand Fokker high-winged monoplane that had been used by Sir Hubert Wilkins for Arctic exploration. It was outfitted with three new 220 hp Wright Whirlwind engines that could turn over at 1,800 rpm and cruise at 120 mph. Two additional fuel tanks gave them a range of 41 hours. Outfitting the Southern Cross with the latest instruments completed the job.

The din of three engines ruled out audible communication between Kingsford-Smith and Ulm in the cockpit and the navigator-radioman team of Lyon and Warner in the cabin; instead they were planning to exchange penciled notes on cardboard.

Departure time was 8:54 a.m. and in spite of the early hour a crowd of several hundred had gathered at Oakland Airport to watch with skepticism as the plane lumbered down the runway. They cheered when it struggled into the air at a speedy 76 knots.

Congratulating each other with notes on the takeoff, the team began the first and "easiest" leg of the journey—the 2,400 miles from San Francisco to Honolulu.

Monotony grew with the slowly passing hours. Jokes jotted on scraps of paper helped them endure the boredom as day wore into night. Two brief encounters with friendly ships temporarily dispelled their growing feeling of isolation as the mainland disappeared and the Southern Cross droned over the vast ocean.

About 6 a.m. the next day, Mauna Kea, the snow-capped volcano on the island of Hawaii peaked through the fog. Then Diamond Head appeared and guided them to Wheeler Field on Oahu. Shortly after noon they landed before a huge cheering crowd, 27 hours and 25 minutes after taking off from San Francisco.

By 5 p.m. the Southern Cross was airborne again, but only for an hour's flight to Barking Sands, a beach on the island of Kauai in the Hawaiian chain. Here they took on fuel, and U.S. Army mechanics found the craft in perfect working order. This was their last stop before the longest leg of the the journey—the projected record-breaking 3,100 mile stretch to Suva in the Fiji Islands.

Then began the most dangerous air journey ever before attempted. A precise course would have to be plotted and flown for an estimated 34½ hours over a trackless sea, in which tiny Fiji appeared no larger than a speck of sand.

They had fuel for 41 hours. One small navigational error could lose them forever.

They had scarcely left Barking Sands when the first of many crises to come occurred. Heavy rains and rough air began to pummel the craft. Kingsford-Smith flew dangerously low, skimming the ocean's surface, in an effort to dodge the persistent storms. Just as they began to emerge from the clouds Warner, the radioman, passed along a note reading, "one generator bad." Panic. But Warner managed to fix it. No sooner had they recovered from that crisis when the radio died, completing their feelings of isolation.

Doubts crept into their minds as the weather worsened again. *Perhaps the critics had been right—the trip was foolhardy!* The sea was so close that at times they felt they would be in it long before ever reaching Suva. Flying blind through a tropical storm that threatened to rip the "Southern Cross" apart, Kingsford-Smith pulled up to 10,000 feet, trying vainly to fly over the plane-shaking turbulence.

The whole crew cheered when Warner reported the radio alive again, but their spirits sank shortly thereafter when the starboard engine began misfiring. When this problem cleared up, the instrument board light failed. They were over the equator at 11:33 in the evening, June 3, with nearly half the journey still before them.

The storm finally subsided, and soon a balmy tradewind sprang up to speed them on their way. On the afternoon of June 5, (a day was lost crossing the Int'l. Dateline)

(L.R.) James Warner, radio, G. Allen Hancock, backer; Harry Lyon, navigator; Charles T. P. Ulm, co-pilot; Charles Kingsford-Smith, pilot.

they landed at Suva, capital of Fiji, to the amazement of natives and officials alike, who turned out to welcome them on the 400-yard grass strip in Albert Park Sports Oval.

The world that had waited tensely was relieved when their arrival was flashed from city to city. It is said that Australia's Prime Minister S. M. Bruce stopped Parliamentary business to announce, "the airmen have landed in Fiji."

Three days later they took off in high spirits for the final leg of the journey, the 1,500 miles to Brisbane, Australia. They had no sooner taken off when their earth inductor compass (a generator-magnetic field compass) failed. In the excitement of leaving Suva, they had forgotten to oil it.

They navigated the remaining distance with a simple magnetic compass whose reliability was weakened by metal objects aboard the aircraft.

As they headed southwest, balmy equatorial breezes gave way to numbing blasts of a Southern Hemisphere winter. Savage winds whipped the craft, so that it took the strength of both Kingsford-Smith and Ulm to keep it under control. Freezing rain drenched the two in the open cockpit as they struggled with the violent bumps of turbulent air. For hundreds of miles there was not a spot of land on which to set down the craft for a moment's rest.

The nightmare ended at 9:50 a.m. June 9 when land was sighted. It was not Brisbane, their intended destination, however, but the town of Ballina, 110 miles south. The storm had thrown them off course. One more hour in flight brought them to the Eagle Farm Aerodrome at Brisbane.

A roar greeted them as they touched down. Blaring horns, cheering voices and sirens that one writer said would ". . . make Gabriel's trumpet sound like a tin whistle," made 15,000 welcoming Australians sound like a frenzied mob. Admiring fans raised about $100,000 cash as a reward for their efforts. From America came a cable saying all their debts were paid.

Elsewhere in the world, however, few persons knew that a crew of four in a rebuilt aircraft had established a new long-distance flying record, or that the stage had been set for a dramatic "shrinking" of the Pacific in the next decade.

The remarkable feat of Charles Kingsford-Smith and his companions has lost its glitter with the passage of time. But those who followed this first effort to conquer the vast Pacific by air freely acknowledged their debt to the four men who had blazed the trail. The battered Fokker had cut a three week journey by ship in half.

Today's jets have reduced the California to Sydney journey to 15 hours and 50 minutes, with comfortable 150-passenger aircraft departing daily.

Australia is still a long way off for most Americans, but thanks to the link established by the intrepid crew of the Southern Cross, it is no longer a stranger. ■

BRIEFS

• ALL TRANSPORT CATEGORY HELICOPTERS operated by air carriers and other commercial operators would be required to have cockpit voice recorders under a proposal now under study by FAA (NPRM 69-15). If adopted, the amendment would take effect six months after adoption but could become effective earlier if equipment is available and installation schedules permit.

The value of cockpit recorders has been repeatedly demonstrated in crash investigation, as well as in establishing procedures to cope with emergencies.

• FLIGHT RESERVATIONS at New York, Chicago, and Washington are now required for all aircraft. Procedures are explained in FAA's recently released Advisory Circular AC 90-43, "Operations Reservations for High-Density Traffic Airports." Copies of the circular may be obtained free of charge from the Department of Transportation, FAA, TAD-484.3, Washington, D.C. 20590.

• THE AIR TRAFFIC FACT BOOK'S latest edition contains a tabulation of operational services available at ATC facilities, including towers and centers as well as their associated aids (radar, navaids, special lighting, etc.). The Fact Book also lists flight assists by facilities, air traffic activity, active litigation cases, staffing and many other details. A limited number of copies are available to the aviation industry. Write to FAA, AT-430, Washington, D. C.

• GENERAL AVIATION ACTIVITY IS HEAVIEST around metropolitan areas, with Los Angeles having the greatest concentration of privately owned aircraft—4,311 airplanes! A complete look at the general aviation scene is found in "Registered General Aviation Aircraft by Community Size, 1963-1968.'' A limited number of free copies of the report are available from the Federal Aviation Administration, TAD-484.3, Washington, D.C. 20590.

• MEETING THE CHALLENGES OF THE FUTURE in aviation will be the theme of the third annual FAA/DOT "Report to Industry," scheduled for June 17 in the DOT Building at 800 Independence Ave., S.W., Washington, D.C. Registration for the conference, open to the aviation industry, begins at 8:30 a.m.

• STUDENT PILOT CERTIFICATES issued in 1968 totaled an impressive 149,444, but this was 9,955 fewer than the number issued in 1967, a drop of six per cent that marked the end of a four-year steady rise. In 1960 there was a 24 per cent decrease, and 1964 showed an 11 per cent slump.

• A NEW LOW-COST ILS SYSTEM FOR STOLs is now under development by the Laboratory For Electronics, Inc., Waltham, Mass., under a recently awarded FAA contract for $544,302. The system will enable the STOL pilot to pre-select, while airborne, an approach angle from 3 to 12 degrees. The STOL/ILS will be built to handle instrument approaches in weather minimums as low as 200 feet and one-half mile visibility.

ALUMINUM CARPET—After skidding 306 feet off the runway at London's Heathrow Airport this DC-8 63F sank into more than three feet of mud, there to remain pending complicated and expensive recovery procedures. Fortunately, British ingenuity intervened with a lightweight aluminum trackway developed by the British Ministry of Defense, and the DC-8 was removed undamaged. The "magic carpet" is a readily transported temporary roadway, 11 feet wide, for use wherever soft ground prevents wheeled vehicles from operating. Carried on a spool mounted in a truck bed, the trackway is speedily laid and is reusable.

FAA Proposes Broader Simulator Use in ATR Pilot Tests

The Federal Aviation Administration is now examining comments on its proposal to alter existing airline training programs in preparation for larger, more complex aircraft now being developed.

Under study are changes that would affect pilot proficiency and type rating flight tests and training of crewmembers and dispatchers. The FAA proposal places emphasis on the role approved flight simulators would play in over-all crewmember training, airline pilot certification, and periodic pilot proficiency checks.

Extensive studies by FAA have shown that a pilot trained through the combined use of approved simulators and airplanes is a better trained pilot than one trained on airplanes alone. In its notice of proposed rule making, the agency noted that visual simulators provide certain advantages that airplanes lack, such as allowing pilots to see and correct mistakes without creating flight hazards in congested airspace.

If approved, the restructured air carrier training program would be instituted in two phases. In contrast to the current practice of approving a carrier's program prior to its initiation, the agency would give initial approval for an interim period and defer final approval until it had observed and made a complete evaluation of the actual training conducted.

Use of the simulators would be approved by FAA on an individual basis, for a particular airplane, an air carrier, a specific maneuver, procedure or function. FAA would also govern the extent to which simulators would be used.

The proposal would also incorporate a recent FAA rule revision requiring pilots to perform, as part of the flight check requirements, at least one non-precision approach in an airplane or a simulator with a visual system. (Non-precision instrument approaches involve use of a navigational landing aid other than an ILS.)

New IFR Rating for Glider Pilots Would Allow Flight into Clouds

Sailplane pilots without instrument ratings may be eligible to fly into clouds under an FAA proposal that would create a new aeronautical rating. Those who qualify for the proposed new rating would be authorized to fly into and within clouds, subject to any restrictions considered necessary for safety by air traffic control.

The new rating would be open to commercial pilots having a glider rating. Non-IFR private pilots with glider ratings would also be eligible provided they met the general aeronautical experience requirements for a commercial certificate with a glider rating. Student pilots would not be eligible.

To qualify for the new cloud-flying rating, pilots would need at least 10 hours of instrument time, compared to 40 required for a regular IFR rating. Five hours of instrument flight instruction would also be required, compared with 15 for the regular IFR rating. In addition, flight instruction would be required in spins and spin recovery, right and left, and successful completion of written and flight tests.

Deadline for comments on the proposed rule change (Notice No. 69-17; Docket No. 9523) is July 14. Comments should be addressed to FAA Rules Docket, GC-24, 800 Independence Ave., S.W., Washington, D.C. 20590.

CUSHY LANDING—Rough or wet landing surfaces pose no problems to the pilot of this test-bed Lake LA-4 amphibian specially modified with a prototype air cushion landing gear. The air cushion landing gear consists of a doughnut-shaped air cushion bag, inflated by forced air. The air escapes downward through thousands of tiny jet nozzles on the underside of the bag, providing a layer of air upon which the aircraft floats. In flight, the bag fits snugly against the underside of the aircraft. Concept is being developed by Bell Aerosystems.

FAA Aviation News welcomes comments from the aviation community. We will reserve this page for an exchange of views. No anonymous letters will be used, but names will be withheld on request.

• Making Their Mark

It will be very hard to misidentify the Naval Air Facility at El Centro, now that the girls from El Cajon, Calif. "Ninety-Nines" left their mark.

I strongly suspect that some record was set inasmuch as the letters are 80 feet high and 50 feet wide. In painting the 12 letters, the girls used 170 gallons of white highway marking paint. It took 15 people approximately five hours to spread the paint with 24-inch rollers.

I think the aviation community should tip its collective hat in appreciation.

Richard S. Campbell
El Cajon, Calif.

• Spinning Your Wheels

Why are tires on large aircraft not designed with anemometer-type cups moulded into the sidewalls or some other device enabling tires to be turning when contact is made with an airport runway, thus saving tire wear and reducing problems of skidding?

G. L. Mastolier
Kalispell, Mont.

The idea has occupied the attention of designers for some 30 years. Moulded cups, vanes and even auxiliary electric motors have been tried, all with little success.

The problem is that to work properly a special tire would need to be designed with a spin to suit the landing speed of every single aircraft model.

The cost of this would far outweigh that of the loss of the rubber from landing on non-rotating wheels.

• How High on Approach?

Could you give me the official FAA recommended procedure for altitude compliance when making a procedure turn-around as published on an Instrument Approach Procedure Chart? Should one maintain that altitude until inbound on the final radial or ILS or is it safe to leave the published altitude while in the 180 degree procedure turn?

Emmette T. Gatewood, Jr.
Los Gatos, Calif.

Advisory Circular 90-1A, page 18, prescribes minimum altitude for the procedure turn until the aircraft is established on the inbound course. The maneuver must be completed within the distance and altitude specified in the profile view.

• One Good Turn . . .

"Lowdown on Letdowns" in the February *FAA Aviation News* was clear as CAVU until I got to page 9, paragraph (2) and read "Standard left turns or specific instruction from air traffic control must be *followed* etc."

This seems to conflict with the preceding paragraph, and with circling approach patterns described in AC 61-27 "Instrument Flying Handbook," both of which permit right turns.

Explanation, please.

John L. Butler
Eldora, Iowa

The paragraph should have read "Standard left turns or specific instructions from air traffic control must be considered etc."

• Mechanically Inclined

Can you send me any material or tell me what I should order from the Superintendent of Documents that would aid me in my studies toward an A&P rating? Also, may I have a list of colleges offering A&P training? Finally, can I qualify as an airframe mechanic only?

N. W. Smith
Borger, Texas

Full details on requirements for a FAA license are contained in Advisory Circular AC 65-2A "Airframe and Powerplant Mechanics Certification Guide", available for 40 cents from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Advisory Circular AC 147-2D "Federal Aviation Administration Certificated Mechanic School Directory" is available free from the Department of Transportation, TAD 484.3, Washington, D.C. 20590.

Persons can qualify for either airframe or powerplant mechanic licenses or both.

• Air Traffic Controller Exam

"Controller College" in the January/February *FAA Aviation News* made interesting reading but was flawed by a minor error. The application form number for the Civil Service Air Traffic Controller Exam is not CS 500-C as you stated, but CSC 5000-C.

Syracuse, N.Y.

Move to the head of the class—you are right.

• When Do You Read Me?

Our recently purchased Stinson is equipped with a 12-channel transmitter. I was told to use frequency 121.5 when the tower does not receive 122.5. When I tried it, San Jose tower asked me to use ground control (121.7 or 121.9) rather than guard. What is FAA's recommendation?

Also, is a remote compass considered a legal replacement for a directional gyro for IFR training or flight, or for night flying?

Dwight Medina
San Jose, Calif.

Channel 121.5 is an emergency channel and should be kept uncluttered with routine transmissions. San Jose tower was correct in advising you to use ground control. If the tower cannot read you on 122.5 advise the tower controllers what frequencies you have available. They will tell you which frequencies they can read you on.

As for the remote compass being used as a substitute for the directional gyro—no, it cannot. The remote compass is not a gyroscopic instrument and is subject to the same errors as a magnetic compass.

• Seal of Approval

I recently upgraded my private pilot's license to a commercial ticket. I would like to know what the blue seal displayed on it means in regard to instrument training. My private license does not have this seal.

I have passed my flight instructor and instrument written tests. If I get my instrument rating before I get my multi-engine rating will the instrument rating be valid in multi-engine aircraft later?

Nicholas J. Zunich, Jr.
Astoria, L.I.

"Blue Seals" are now being issued to all pilots who have demonstrated their ability to control an airplane in flight by reference to instruments. Your instrument rating will be valid in either single or multi-engine aircraft regardless of which class was used for the instrument rating flight test.

• On Instruments

The April FAA AVIATION NEWS indicated that the Flight Instructor Revalidation Clinic to be given at the College of San Mateo (Calif.) on June 24, 25, and 26 will be for *airplanes.*

Our plans have been somewhat altered—the clinic dates remain the same, but the program has been changed to *Instrument.*

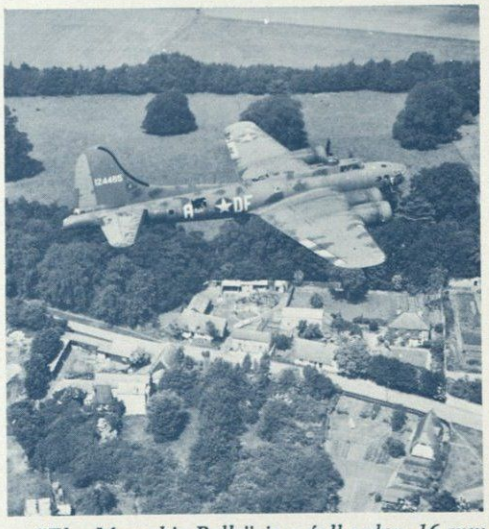
George Van Vliet
Aeronautics Division
College of San Mateo

• The Memphis Belle

In 1943 or 1944 I saw a short documentary film entitled "The Memphis Belle," which followed the history of a particular B-17 through 25 missions in World War II.

Can you tell me where I can borrow a copy of this film?

James L. Smith, Jr.
Baltimore, Md.



"The Memphis Belle" is a full color, 16 mm film with a showing time of 42 minutes, made in WW II by the Air Force. A loan copy may be obtained from the U.S. Air Force Film Library, 8900 South Broadway, St. Louis, Mo. 63125. Phone: 314—268-8243.

The "Memphis Belle" itself is enshrined as a war memorial in Memphis, Tenn.

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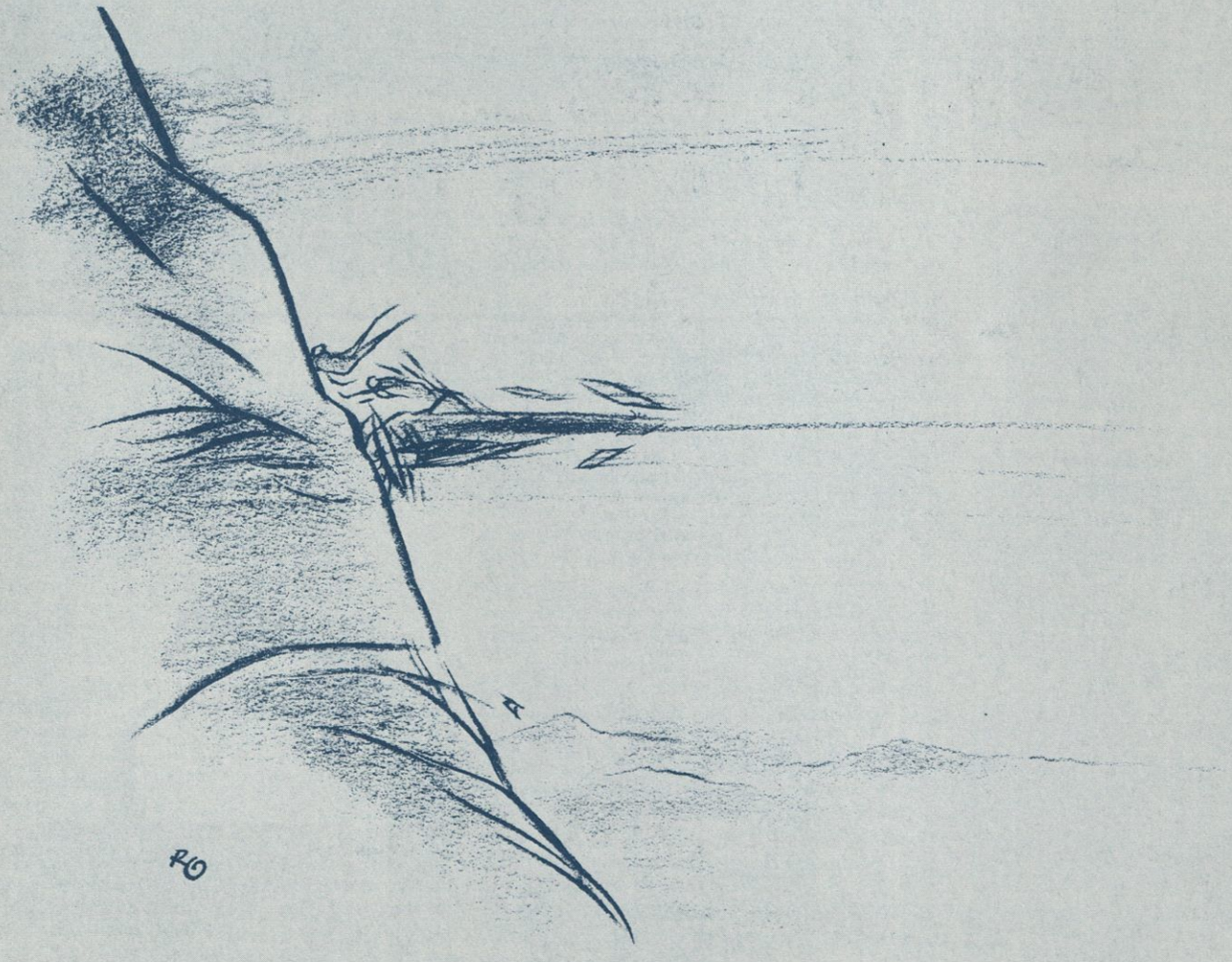

Many pilots and rocks have gotten together

Suggested by L. Dravenstadt